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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/544,251	10/12/2006	Erwan Pincemin	2085-100US	2372

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EXAMINER	
CURS, NATHAN M	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/544,251	PINCEMIN, ERWAN	
	Examiner	Art Unit	
	NATHAN M. CURS	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11 and 13-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11 and 13-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 11, 15, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stock et al. ("Stock") (US Patent No. 6249630) in view of Moeller (US Patent Application Publication No.2004/0062552) and further in view of Allison et al. ("Allison") (US Patent No. 5812729).

Regarding claim 11, Stock discloses apparatus for transmitting a signal through an optical transmission network (fig. 1 and col. 6 lines 28-40), the apparatus comprising a pulse emitter and at least one line fiber for conveying at least one pulse in said line fiber (fig. 1 elements 10 and 30 and col. 6 lines 41-51), wherein the apparatus comprises a spreader module for spreading pulses, said spreader module comprising a propagation medium that is dispersive, said propagation medium presenting accumulated chromatic dispersion (fig. 1 element 20 and col. 6 lines 41-49, where the optical fiber of the pulse stretcher is inherently dispersive presenting accumulated chromatic dispersion) that is high enough to lower the peak power of the pulse to below a predetermined threshold, where a signal above said threshold is liable to be subjected to non-linear distortion in the line fiber (col. 5 lines 33-39, col. 6 lines 48-49 and col. 8

lines 15-29, where the predetermined threshold is the power level that the pulse power is reduced from in order to avoid non-linear effects), said spreader module being disposed between the emitter and the line fiber. Stock does not specifically disclose that the optical transmission network is a data transmission network. Moeller discloses an optical data transmission system where pulse peak power is reduced to avoid non-linear effects and extend optical communication. Since Moeller reveals that pulse peak power reduction can also be used in an optical data communication system to avoid non-linear effects, increase transmission performance, and extended communication, one of ordinary skill in the art at the time of the invention could have modified Stock to transmit data from the source point to the destination point, and the results would have been predictable. Namely, the system would provide optical data communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Stock to transmit data from the source point to the destination point, for the predictable result of the system providing optical data communication.

Also, Stock does not disclose that the pulse spreading is linear, the propagation medium being linear, or that the spreader module comprises a fiber of the high order mode type, or of the super large area type. Allison discloses using linear fiber of the high order mode type for optical pulse broadening (col. 2 lines 34-46 and col. 7 lines 24-41). One of ordinary skill in the art at the time of the invention could have used a linear high order mode VHNA fiber like that of Allison for the waveguide of the spreader of the combination, and the results would have predictable; namely, the VHNA fiber would provide pulse broadening. Therefore, it would have been obvious to one of ordinary

skill in the art at the time of the invention to use a high order mode VHNA fiber like that of Allison for the waveguide of the spreader of the combination, for the predictable result of the VHNA fiber providing pulse broadening.

Regarding claim 15, the combination of Stock, Moeller and Allison discloses the use of apparatus according to claim 11, and discloses optical pulse widths of less than 100 ps (Stock: col. 6 lines 34-36), but does not disclose that the data rate is not less than 160 Gbit/s. However, a data rate of not less than 160 Gbit/s is equal to a bit interval of not more than 6.25 ps. The disclosed pulse widths of the combination of less than 100 ps overlap with the claimed bit interval of 6.25 ps. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a data rate of 160 Gbit/s for the data transmission of the combination, because where claimed ranges overlaps or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists (see MPEP § 2144.05).

Regarding claim 16, Stock discloses a method of transmitting a signal through an optical transmission network (fig. 1 and col. 6 lines 28-40), the method comprising the steps consisting in emitting at least one pulse and in conveying said pulse via an optical transmission network comprising at least one line fiber (fig. 1 elements 10 and 30 and col. 6 lines 41-51), wherein the method further comprises, prior to conveying the pulse to the line fiber, a step consisting in causing the pulse to be conveyed by a propagation medium that is dispersive in a spreader module, said propagation medium presenting accumulated chromatic dispersion (fig. 1 element 20 and col. 6 lines 41-49, where the optical fiber of the pulse stretcher is inherently dispersive presenting accumulated

chromatic dispersion) that is high enough to lower the peak power of the pulse to below a predetermined threshold, where a signal above said threshold is liable to be subjected to non-linear distortion in the line fiber (col. 5 lines 33-39, col. 6 lines 48-49 and col. 8 lines 15-29, where the predetermined threshold is the power level that the pulse power is reduced from in order to avoid non-linear effects). Stock does not specifically disclose that the optical transmission network is a data transmission network. Moeller discloses an optical data transmission system where pulse peak power is reduced to avoid non-linear effects and extend optical communication. Since Moeller reveals that pulse peak power reduction can also be used in an optical data communication system to avoid non-linear effects, increase transmission performance, and extended communication, one of ordinary skill in the art at the time of the invention could have modified Stock to transmit data from the source point to the destination point, and the results would have been predictable. Namely, the system would provide optical data communication. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Stock to transmit data from the source point to the destination point, for the predictable result of the system providing optical data communication.

Also, Stock does not explicitly disclose that the propagation medium is also linear, or that the spreader module comprises a fiber of the high order mode type, or of the super large area type. Allison discloses using linear fiber of the high order mode type for optical pulse broadening (col. 2 lines 34-46 and col. 7 lines 24-41). One of ordinary skill in the art at the time of the invention could have used a linear high order

mode VHNA fiber like that of Allison for the waveguide of the spreader of the combination, and the results would have predictable; namely, the VHNA fiber would provide pulse broadening. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a high order mode VHNA fiber like that of Allison for the waveguide of the spreader of the combination, for the predictable result of the VHNA fiber providing pulse broadening.

Regarding claim 18, the combination of Stock, Moeller and Allison discloses the use of a method according to claim 16, and discloses optical pulse widths of less than 100 ps (Stock: col. 6 lines 34-36), but does not specifically disclose transmission at a data rate of not less than 160 Gbit/s. However, a data rate of not less than 160 Gbit/s is equal to a bit interval of not more than 6.25 ps. The disclose pulse widths of the combination of less than 100 ps overlap with the claimed bit interval of 6.25 ps. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a data rate of 160 Gbit/s for the data transmission of the combination, because where claimed ranges overlaps or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists (see MPEP § 2144.05).

3. Claims 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stock (US Patent No. 6249630) in view of Moeller (US Patent Application Publication No. 2004/0062552) and further in view of Allison (US Patent No. 5812729) as applied to claims 11, 15, 16, and 18 above, and further in view of Bai (US Patent Application Publication No. 2002/0036812).

Regarding claim 13, the combination of Stock, Moeller and Allison discloses transmission apparatus according to claim 11, but does not disclose that it includes a plurality of amplifier modules disposed regularly along the line fiber, each including a dispersion compensation module comprising a propagation medium that is dispersive and linear. Bai discloses using an optical amplifier with a linear dispersion compensator for each span of a transmission line, to compensate for dispersion of the transmission line affecting the optical pulses and to maintain intensity of the optical pulses (figs. 1 and 2 and paragraph 0030). It would have been obvious to one of ordinary skill in the art at the time of the invention to use multiple spans in the transmission line of the combination, each span with an amplifier plus linear dispersion compensator, to provide the benefit of compensating for dispersion of the line and maintaining intensity of the optical pulses. The combination as described above does not specifically disclose the dispersion compensator and optical amplifier as a single module. However, the Office takes official takes official notice that it's well known to group in-line optical amplifiers and in-line dispersion compensators into the same module or circuit pack. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to group in-line optical amplifiers and in-line dispersion compensators into the same module or circuit pack, to provide the benefit of reducing the number of different physical components and optimizing equipment space requirements.

Regarding claim 17, the combination of Stock, Moeller and Allison discloses a transmission method according to claim 16, but does not disclose that a transmitted pulse is amplified by amplifier modules disposed regularly along the line fiber, or that

the pulse is conveyed within the amplifier modules in a propagation medium that is dispersive and linear in order to compensate the dispersion to which the pulse has been subjected in the line fiber. Bai discloses using an optical amplifier with a linear dispersion compensator for each span of a transmission line, to compensate for dispersion of the transmission line affecting the optical pulses and to maintain intensity of the optical pulses (figs. 1 and 2 and paragraph 0030). It would have been obvious to one of ordinary skill in the art at the time of the invention to use multiple spans in the transmission line of the combination, each span with an amplifier plus linear dispersion compensator, to provide the benefit of compensating for dispersion of the line and maintaining intensity of the optical pulses. The combination as described above does not specifically disclose the dispersion compensator and optical amplifier as a single module. However, the Office takes official takes official notice that it's well known to group in-line optical amplifiers and in-line dispersion compensators into the same module or circuit pack. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to group in-line optical amplifiers and in-line dispersion compensators into the same module or circuit pack, to provide the benefit of reducing the number of different physical components and optimizing equipment space requirements.

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stock (US Patent No. 6249630) in view of Moeller (US Patent Application Publication No. 2004/0062552) and further in view of Allison (US Patent No. 5812729), and further in

view of Bai (US Patent Application Publication No. 2002/0036812) as applied to claims 13 and 17 above, and further in view of Johnson (US Patent Application Publication No. 2002/0176676).

Regarding claim 14, the combination of Stock, Moeller, Allison and Bai discloses transmission apparatus according to claim 13, but does not specifically disclose that the dispersion compensation module comprises a fiber of the high order mode type, the super large area type, or having photonic crystals. Johnson discloses using photonic crystal waveguides for tailored dispersion profile waveguides (abstract and paragraph 0008). One of ordinary skill in the art at the time of the invention could have used a tailored photonic crystal waveguide for the waveguide of the stretcher of the combination, and the results would have predictable; namely, the dispersion profile of the waveguide would be tailored to provide the necessary amount of dispersion to stretch the pulses. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a tailored photonic crystal waveguide for the waveguide of the stretcher of the combination, the predictable result of providing the necessary amount of dispersion to stretch the pulses used a tailored waveguide.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stock (US Patent No. 6249630) in view of Allison (US Patent No. 5812729).

Regarding claim 19, Stock discloses a module comprising a propagation medium that is dispersive (fig. 1 element 20 and col. 6 lines 41-49, where the optical fiber of the pulse stretcher is inherently dispersive), said module being disposed between a pulse

emitter and a line fiber in order to transmit pulses into the line and to spread pulses (fig. 1 elements 10 and 30 on either side of element 20 and col. 6 lines 41-49), with the accumulated chromatic dispersion of said module being high enough to lower the peak power of pulses to below a predetermined threshold, above which the signal is subjected to distortion (col. 5 lines 33-39, col. 6 lines 48-49 and col. 8 lines 15-29, where the amount dispersion reduces the level of pulse power in order to avoid non-linear effects). Stock does not explicitly disclose that the propagation medium is also linear, or that the module comprises a fiber of the higher order mode type or of the super large area type. Allison discloses using linear fiber of the high order mode type for optical pulse broadening (col. 2 lines 34-46 and col. 7 lines 24-41). One of ordinary skill in the art at the time of the invention could have used a linear high order mode VHNA fiber like that of Allison for the medium of the module, and the results would have predictable; namely, the VHNA fiber would provide pulse broadening. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a high order mode VHNA fiber like that of Allison for the medium of the module, for the predictable result of the VHNA fiber providing pulse broadening.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bai (US Patent Application Publication No. 2002/0036812) in view of Allison (US Patent No. 5812729).

Regarding claim 20, Bai discloses an amplifier module in a line fiber for transmitting pulses into the line, said amplifier arrangement comprising pulse amplifier

means and a compensation module comprising a propagation medium that is dispersive and linear in order to increase the peak power and reduce the width of the pulses (figs. 1 and 2 and paragraph 0030, where compensating for dispersion and maintaining intensity of optical pulses indicates that the pulses arriving at the arrangement are spread out and reduced due to dispersion and the compensation and amplifier reduce the pulse width and increase the pulse power back to the desired level). Bai does not explicitly disclose that the compensation module comprises a fiber of the higher order mode type or of the super large area type. Allison discloses using linear fiber of the high order mode type for optical pulse broadening (col. 2 lines 34-46 and col. 7 lines 24-41). One of ordinary skill in the art at the time of the invention could have used a linear high order mode VHNA fiber like that of Allison for the fiber of the module, and the results would have predictable; namely, the VHNA fiber would provide pulse broadening. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a high order mode VHNA fiber like that of Allison for the fiber of the module, for the predictable result of the VHNA fiber providing pulse broadening.

Also, Bai does not specifically disclose the dispersion compensator and optical amplifier as a single module. However, the Office takes official takes official notice that it's well known to group in-line optical amplifiers and in-line dispersion compensators into the same module or circuit pack. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to group in-line optical amplifiers and in-line dispersion compensators into the same module or circuit pack, to provide the

benefit of reducing the number of different physical components and optimizing equipment space requirements.

Response to Arguments

7. Applicant's arguments filed 25 February 2010 have been fully considered but they are moot in view of the new grounds of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN M. CURS whose telephone number is (571)272-3028. The examiner can normally be reached on 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NATHAN M CURS/

Primary Examiner, Art Unit 2613